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10/666,668	09/19/2003	Vasudev Bhaskaran	AP171HO	8252

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EXAMINER	
SENFI, BEHROOZ M	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/666,668	Applicant(s) BHASKARAN, VASUDEV	
	Examiner Behrooz Senfi	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 August 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 6-11,20-25 and 29-34 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 6-11,20-25 and 29-34 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 8/24/2007.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 6 – 11, 20-25 and 29-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yan (US 5,438,374) in view of Hayashi et al. (US 6,041,145) and Hui (US 5,260,782).

Regarding claim 6, Yan '374 discloses; a method for adaptively filtering a video Signal prior to encoding (i.e. fig. 1, preprocessing 2 and pre-filter 3, col. 3, lines 16 – 19) comprising: calculating a local gradient indicative of a region type (i.e. the mathematical equation as shown in Col. 6, lines 40 - 45 of Yan, is consider "calculating local gradient", because this equation enable the temporal filter to differentiate between region, such as stationary areas, transition areas, and moving areas by selecting a weight factor, e.g. lines 35 - 68 and Figs. 4 and 5), determining a weight factor based upon the local gradient (i.e. col. 6, lines 35-68 and Figs. 4 and 5, where discloses weighting factor α is determined based upon differences between areas, e.g. local gradient; thus the equation enable filter to differentiate between region, such as stationary areas, transition areas, and moving areas by determining a weight factor) and applying the weighted factor to a difference signal according to the region type (i.e. figs. 4 and 5, col. 6, lines 35-68 and col. 8, lines 66 – 68, where discloses multiplying, e.g. applying, the

weighted factor α to a difference signal based on the region type; such as stationary areas, transition areas, and moving areas).

Yan '374 is silent in regards to explicit of "the difference signal representing a difference between the video signal and an output of a smoothing filter through which the video signal passes".

Hayashi '145 in the same field of filtering picture signal teaches the above subject matter (please see; in-loop filter 23 in fig. 1 of Hayashi, col. 14, lines 59 – 60 of Hayashi, a smoothing filter is installed in the in-loop filter 23, the subtracter calculates the difference between the video signal 10 and an output of the smoothing filter 23; thus the output of the subtracter 11, represents a difference between the video signal and an output of a smoothing filter through which the video signal passes).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the filtering process of Yan in accordance with the teaching of Hayashi, by using a smoothing filter and subtracter, to differentiate between the video/picture signal and the output of the filter signal (i.e. fig. 1, the output of smoothing filter that is installed in the filter 23 is being subtracted "e.g. fig. 1, element 11" from the video signal 10, and provides "e.g. represents" the difference signal to the encoder 12), to improve picture quality by decrease distortion occurred on a block boundary, see col. 22, lines 43 – 45 of Hayashi).

Furthermore, Yan '374 is silent in regards to explicit of detecting the region type "within a frame of the video signal, the region type being one of an edge region or a smooth region".

However, Hui '782 teaches, detecting the region type "within a frame of the video signal, the region type being one of an edge region" (i.e., col. 3, lines 61 – 66 of Hui).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the filtering process of Yan in accordance with the teaching of Hui, in order to provide a method of coding a video signal without causing the ringing effects around an edge boundary of an object against a smooth region, as suggested by Hui (see col. 2, lines 45 – 47 of Hui).

Regarding claim 7, the combination of Yan, Hayashi and Hui teaches, calculating a local gradient indicative of a region type by filtering (pre-filtering) the video signal (e.g. picture) to reduces noise, using difference in pixel values in different areas/regions (please see, fig. 1, pre-filter 3 and col. 3, Lines 16 – 19, col. 6, lines 35-68 and figs. 4 and 5; where the mathematical equation as shown in Col. 6, lines 40-45 of Yan is consider "calculating local gradient", thus the equation enable the filter to differentiate between region "e.g. pixel values differences", such as stationary areas, transition areas, and moving areas by selecting/determining a weight factor), defining a neighborhood of values around a current pixel value; and quantifying a difference between each of the neighborhood of values and the current pixel value (please see, col. 5, lines 48 – 50 and lines 61 – 65 of Hayashi, where indicates target pixel value and its surrounding (e.g. neighborhood) pixels value and detecting/quantifying difference values between the target pixel and each of its surrounding pixels value) in the process of smoothing the picture signal by applying a smoothing filter to control the degree of

noise influence and obtain a high quality picture, see col. 5, lines 44 – 50 and line 60 – col. 6, lines 7 of Hayashi).

Regarding claim 8, the combination of Yan, Hayashi and Hui teaches, applying a filter to the video signal (i.e. fig. 1, filter 3 and col. 3, Lines 16 – 19 of Yan) to create a noise reduced signal, and comparing the difference to a threshold value (please see, col. 10, lines 64 – 66 of Hayashi, where indicates determining whether the difference exceeds a certain threshold); and as for, applying a smoothing function to the current pixel value when the difference is greater than the threshold value (please see, col. 10, lines 64 – 67 of Hayashi, where indicates only when the difference exceeds a threshold value applying a smoothing function "e.g. filtering").

Regarding claim 9, the combination of Yan, Hayashi and Hui teaches, applying a filter to the video signal (i.e. fig. 1, filter 3 and col. 3, Lines 16 – 19 of Yan) to create a noise reduced signal, and applying a smoothing filter to the video signal, and calculating a difference between the video signal and an output of the smoothing filter, and representing the difference between the video signal and the output of the smoothing filter as the difference signal (please see; in-loop filter 23 in fig. 1 of Hayashi, consider as applying a smoothing filter to the video signal; since, as indicated in col. 14, lines 59 – 60 of Hayashi, a smoothing filter is installed in the in-loop filter 23, calculating a difference between the video signal and an output of the smoothing filter, and representing the difference between the video signal and the output of the smoothing filter as the difference signal; as shown in fig. 1 of Hayashi, element 11 "e.g. subtracter" calculates the difference between the video signal 10 and an output of the smoothing

filter 23; thus the output of the subtracter 11 provided to the encoder 12, represents the difference between the video signal and the output of the smoothing filter, which is a difference signal).

Regarding claim 10, the combination of Yan, Hayashi and Hui teaches, receiving a signal (please see, fig. 1, processor 2 receiving a signal from the video source 1 of Yan) and applying a filter to the video signal (please see, fig. 1, filter 3 and col. 3, Lines 16 – 19 of Yan, where indicates applying a filter to the video signal) to create a noise reduce signal, and smoothing filter to the video signal and reduce a bit-rate (please see; in-loop filter 23 in fig. 1 of Hayashi, consider as applying a smoothing filter to the video signal; since, as indicated in col. 14, lines 59 – 60 and col. col. 22, lines 42 – 53 of Hayashi, a smoothing filter is installed in the in-loop filter 23, to smooth the picture signal and control/reduce degree of noise influence in input picture signal; thereby decreasing/reducing the bit rate/quantity).

Regarding claim 11, the combination of Yan, Hayashi and Hui teaches, applying the weighted factor to a difference signal according to the region type (please see; figs. 4 and 5, col. 6, lines 35 -68 and col. 8, lines 66 – 68 of Yan; where indicates multiplying, e.g. applying, the weighted factor α to a difference signal "e.g. differences between region/areas, such as stationary areas, transition areas, and moving areas" based on the region type; such as stationary areas, transition areas, and moving areas) and constructing the weighted factor in a manner such that a higher weight factor diminishes a contribution of a smoothing filter (please see, col. 4, lines 28 – 33 of Hayashi; where indicates, if the difference is great "e.g. edge exists" the weighting factor

decreases, leading to a filtering, and vice verses; if the difference is small, the weighting factor increases, so that the surrounding pixel and the target pixel value are homogenized "e.g. which consider as, diminishes a contribution of a smoothing filter based on weighting factor").

Regarding claim 20, it is noted that, the limitations as claimed are computer readable medium intended to perform the steps of the method of claim 6; Yan '374 discloses, a computer readable medium for adaptively filtering a video signal prior to encoding (i.e. fig. 1, preprocessor 2 and computer processor 50, col. 3, lines 16 – 19, are used for filtering a video signal) comprising: Yan '374 discloses, calculating a local gradient indicative of a region type (i.e. the mathematical equation as shown in Col. 6, lines 40-45 of Yan is consider "calculating local gradient", because this equation enable the temporal filter to differentiate between region, such as stationary areas, transition areas, and moving areas by selecting a weight factor as discussed in col. 6, lines 35-68 and Figs. 4 and 5), determining a weight factor based upon the local gradient (i.e. col. 6, lines 35-68 and Figs. 4 and 5, where discloses weighting factor α is determined based upon differences between areas, e.g. local gradient; thus the equation enable filter to differentiate between region, such as stationary areas, transition areas, and moving areas by determining a weight factor) and applying the weighted factor to a difference signal according to the region type (i.e. figs. 4 and 5, col. 6, lines 35-68 and col. 8, lines 66 – 68, where discloses multiplying, e.g. applying, the weighted factor α to a difference signal based on the region type, such as such as stationary areas, transition areas, and moving areas), as for computer readable medium (please see; col. 3, lines, 16 – 19 and

lines 41 – 44, where discloses programmed computer processor for performing the functions of the pre-filter). Therefore, the program instruction to be used by the computer processor 50 to perform the above steps for filtering a video signal prior to encoding would have been necessitated and implies in Yan's system.

Regarding claim 21, the combination of Yan, Hayashi and Hui teaches, a computer readable medium (please see; fig. 1 of Yan, preprocessor 2 and computer processor 50, col. 3, lines 16 – 19, are used for filtering a video signal) thus calculating a local gradient indicative of a region type (please see; the mathematical equation as shown in Col. 6, lines 40 - 45 of Yan, is consider "calculating local gradient", because this equation enable the filter to differentiate between region "pixel values differences", such as stationary areas, transition areas, and moving areas by selecting a weight factor, as discussed earlier in claim 6 above), and defining a neighborhood of values around a current pixel value; and quantifying a difference between each of the neighborhood of values and the current pixel value (i.e. col. 5, lines 48 – 50 and lines 61 – 65 of Hayashi, indicates target pixel and its surrounding "e.g. neighborhood" pixels and detecting difference values between the target pixel and each of its surrounding pixels) in smoothing process to smooth the picture signal and control the degree of noise influence to obtain a high quality picture, see col. 5, lines 44 – 50 and line 60 – col. 6, lines 7 of Hayashi).

Regarding claim 22, the combination of Yan, Hayashi and Hui teaches, computer readable medium (please see; fig. 1, preprocessor 2 and computer processor 50, col. 3, lines 16 – 19, used for filtering a video signal), determining a weighting factor

based upon the local gradient (i.e. col. 6, lines 35 - 68 and Figs. 4 and 5, where indicates weighting factor α is determined based upon differences between areas, e.g. local gradient; thus the equation enable filter to differentiate between region, such as stationary areas, transition areas, and moving areas by determining a weight factor, as discussed earlier in claim 6 above) Furthermore; program instructions to be executed by the computer readable medium 50 to perform the above steps would have been obvious over the teaching of the above prior arts, and normalizing a difference between each of the neighborhood of values and the current pixel value (please see; col. 5, lines 48 – 60 of Hayashi, "e.g. normalizing A/B; it is noted that, determination of sum (A) for normalization, includes detecting difference between a target pixel value and each of its surrounding pixels value" and further, col. 18, lines 5 – 15, indicates normalizing a difference between each pixel value).

Regarding claim 23, the combination of Yan, Hayashi and Hui teaches, the computer readable medium (please see; fig. 1, preprocessor 2 and computer processor 50, col. 3, lines 16 – 19, are used for filtering a video signal), further comprising; applying a filter to the video signal (please see; fig. 1, filter 3 and col. 3, Lines 16 – 19; indicates applying filter to the video signal to create a noise reduced signal), smoothing filter and calculating a difference between the video signal and an output of the smoothing filter; and representing the difference between the video signal and the output of the smoothing filter as the difference signal (please see; in-loop filter 23 in fig. 1 of Hayashi, consider as applying a smoothing filter to the video signal; since, as indicated in col. 14, lines 59 – 60 of Hayashi, a smoothing filter is installed in the in-loop

filter 23) and furthermore; as for "calculating a difference between the video signal and an output of the smoothing filter, and representing the difference between the video signal and the output of the smoothing filter as the difference signal"; it is noted that, as shown in (please see; fig. 1 of Hayashi, element 11 "e.g. subtracter" calculates the difference between the video signal 10 and an output of the smoothing filter 23; thus the output of the subtracter 11 provided to the encoder 12, represents the difference between the video signal and the output of the smoothing filter, which is a difference signal).

Regarding claim 24, the combination of Yan, Hayashi and Hui teaches, the computer readable medium (please see; fig. 1, preprocessor 2 and computer processor 50, col. 3, lines 16 – 19, are used for filtering a video signal) further comprising; receiving a signal (see; fig. 1, processor 2 receiving the video signal from the video source 1) and in response to receiving the signal, applying a filter to the video signal (please see, fig. 1, filter 3 and col. 3, Lines 16 – 19, where indicates applying filter to the video signal to create a noise reduced signal), smoothing filter to the video signal and reduce a bit-rate (please see; in-loop filter 23 in fig. 1 of Hayashi, consider as applying a smoothing filter to the video signal; since, as indicated in col. 14, lines 59 – 60 of Hayashi, a smoothing filter is installed in the in-loop filter 23, to smooth the picture signal and control/reduce degree of noise influence in input picture signal; thereby decreasing/reducing the bit rate/quantity).

Regarding claim 25, the combination of Yan, Hayashi and Hui teaches, the

computer readable medium (i.e. fig. 1 of Yan, preprocessor 2 and computer processor 50, col. 3, lines 16 – 19, are used for filtering a video signal); Yan '374 further teaches, applying the weighted factor to a difference signal according to the region type (i.e. figs. 4 and 5, col. 6, lines 35-68 and col. 8, lines 66 – 68, where indicates multiplying, e.g. applying, the weighted factor α to a difference signal based on the region type; such as stationary areas, transition areas, and moving areas), constructing the weighted factor in a manner such that a higher weight factor diminishes a contribution of a smoothing filter(please see, col. 4, lines 28 – 33 of Hayashi; where indicates, if the difference is great "e.g. edge exists" the weighting factor decreases, leading to a filtering, and vice verses; if the difference is small, the weighting factor increases, so that the surrounding pixel and the target pixel value are homogenized "e.g. which consider as, diminishes a contribution of a smoothing filter based on weighting factor").

Regarding claim 29, the limitations claimed are substantially similat to claim 6 above, therefore the grounds for rejecting claim 6 also applies here.

Regarding claim 30, the combination of Yan, Hayashi and Hui teaches, circuitry for calculating a local gradient indicative of a region type (i.e. fig. 1, circuitry 2 and 3; the mathematical equation as shown in Col. 6, lines 40 - 45 of Yan, is consider "calculating local gradient", because this equation enable the temporal filter to differentiate between region, such as stationary areas, transition areas, and moving areas by selecting a weight factor, e.g. lines 35 - 68 and Figs. 4 and 5 of Yan), defining a neighborhood of values around a current pixel value; and quantifying a difference between each of the neighborhood of values and the current pixel value (please see,

col. 5, lines 48 – 50 and lines 61 – 65 of Hayashi, where indicates target pixel value and its surrounding (e.g. neighborhood) pixels value and detecting/quantifying difference values between the target pixel and each of its surrounding pixels value, in the process of smoothing the picture signal by applying a smoothing filter to control the degree of noise influence and obtain a high quality picture, see col. 5, lines 44 – 50 and line 60 – col. 6, lines 7 of Hayashi).

Regarding claim 31, the combination of Yan, Hayashi and Hui teaches, circuitry for determining a weight factor based upon the local gradient (please see; col. 6, lines 35-68 and Figs. 4 and 5 of Yan, where discloses weighting factor α is determined based upon differences between areas, e.g. local gradient; thus the equation enable filter to differentiate between region, such as stationary areas, transition areas, and moving areas by determining a weight factor, as discussed earlier in claim 6 above), normalizing a difference between each of the neighborhood of values and the current pixel value(please see; col. 5, lines 48 – 60 "e.g. normalizing A/B" of Hayashi; it is noted that, determination of sum (A) for normalization, includes detecting difference between a target pixel value and each of its surrounding pixels value" and further, col. 18, lines 5 – 15, indicates normalizing a difference between each pixel value).

Regarding claim 32, the combination of Yan, Hayashi and Hui teaches, integrated circuit (i.e. fig. 1, circuitry used for filtering a video signal of Yan), further comprising; circuitry for applying a filter to the video signal (please see; fig. 1, filter 3 and col. 3, Lines 16 – 19, applying filter to the video signal to create a noise reduced

signal of Yan), smoothing filter and calculating a difference between the video signal and an output of the smoothing filter; wherein the difference between the video signal and the output of the smoothing filter represents the difference signal (please see; in-loop filter 23 in fig. 1 of Hayashi, consider as applying a smoothing filter to the video signal; since, as indicated in col. 14, lines 59 – 60 of Hayashi, a smoothing filter is installed in the in-loop filter 23, and furthermore; calculating a difference between the video signal and an output of the smoothing filter, and representing the difference between the video signal and the output of the smoothing filter as the difference signal; it is noted that, as shown in (please see; fig. 1 of Hayashi, element 11 "e.g. subtracter" calculates the difference between the video signal 10 and an output of the smoothing filter 23; thus the output of the subtracter 11 provided to the encoder 12, represents the difference between the video signal and the output of the smoothing filter, which is a difference signal).

Regarding claim 33, the combination of Yan, Hayashi and Hui teaches, further comprising; circuitry for receiving a signal (please see; fig. 1, circuit 2 receiving the video signal from the video source 1 of Yan) and circuitry for applying a filter to the video signal (please see, fig. 1, filter 3 and col. 3, Lines 16 – 19, where teaches applying filter to the video signal to create a noise reduced signal of Yan), smoothing filter, and reduce a bit-rate rate (please see; in-loop filter 23 in fig. 1 of Hayashi, consider as applying a smoothing filter to the video signal; since, as indicated in col. 14, lines 59 – 60 of Hayashi, a smoothing filter is installed in the in-loop filter 23, to smooth the picture

signal and control/reduce degree of noise influence in input picture signal; thereby decreasing/reducing the bit rate/quantity).

Regarding claim 34, the combination of Yan, Hayashi and Hui teaches, circuitry for applying the weight factor to a difference signal according to the region type (i.e. figs. 1, 4 and 5, col. 6, lines 35-68 and col. 8, lines 66 – 68 of Yan, where discloses multiplying, e.g. applying, the weighted factor α to a difference signal based on the region type; such as stationary areas, transition areas, and moving areas), constructing the weighted factor in a manner such that a higher weight factor diminishes a contribution of a smoothing filter(please see, col. 4, lines 28 – 33 of Hayashi; where indicates, if the difference is great "e.g. edge exists" the weighting factor decreases, leading to a filtering, and vice verses; if the difference is small, the weighting factor increases, so that the surrounding pixel and the target pixel value are homogenized "e.g. which consider as, diminishes a contribution of a smoothing filter based on weighting factor").

Conclusion

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Behrooz Senfi whose telephone number is 571-272-7339. The examiner can normally be reached on M-F 7:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Behrooz Senfi
Examiner
Art Unit 2621